Order Code RL31260

Digital Television: An Overview

Updated January 4, 2005

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Summary

Digital television (DTV) is a new television service representing the most significant development in television technology since the advent of color television in the 1950s. DTV can provide sharper pictures, a wider screen, CD-quality sound, better color rendition, and other new services currently being developed. The nationwide deployment of digital television is a complex and multifaceted enterprise. A successful deployment requires: the development by content providers of compelling digital programming; the delivery of digital signals to consumers by broadcast television stations, as well as cable and satellite television systems; and the widespread purchase and adoption by consumers of digital television equipment.

Congress and the Federal Communications Commission (FCC) have set a target date of December 31, 2006 for broadcasters to cease broadcasting their analog signals and return their existing analog television spectrum to be auctioned for commercial services (such as broadband) or used for public safety communications. However, the Balanced Budget Act of 1997 (P.L. 105-33) allows a station to delay the return of its analog spectrum if 15% or more of the television households in its market do not subscribe to a multi-channel digital service and do not have digital television sets or converters. Given the slower-than-expected pace that digital televisions have been introduced into American homes, few observers believe that the goal of digital televisions in 85% of American homes by 2006 will be reached, with the result that television stations will continue to broadcast both analog and digital signals past the 2006 deadline. The key issue for Congress and the FCC is: what steps, if any, should be taken by government to further facilitate a timely, efficient, and equitable transition to digital television?

The 109th Congress will likely continue to debate whether and how a "hard date" for the digital television transition should be implemented, thereby freeing reclaimed analog spectrum. Key policy questions include should the existing statutory digital transition deadline of December 31, 2006 be implemented by modifying or removing the 85% digital penetration threshold requirement, or would a later and redefined transition deadline be more appropriate? Should the reclaiming of analog spectrum for public safety uses be singularly designated, or should it be included as part of a comprehensive approach to returning all of the analog spectrum? Paramount in this debate is the issue of addressing the millions of American over-the-air households whose existing analog televisions will require converter boxes in order to receive digital signals, if and when the analog signal is turned off.

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Most Recent Developments

The Intelligence Reform and Terrorism Prevention Act of 2004 (P.L. 108-458) was signed into law on December 17, 2004. Section 7501 states that it is the sense of Congress that "Congress must act to pass legislation in the first session of the 109th Congress that establishes a comprehensive approach to the timely return of analog broadcast spectrum as early as December 31, 2006" and that any delay in the adoption of such legislation will "delay the ability of public safety entities to begin planning to use this needed spectrum." Meanwhile, on December 8, 2004, the President signed the Satellite Home Viewer Extension and Reauthorization Act (SHVERA) as part of the FY2005 Consolidated Appropriations Act (P.L. 108-447). SHVERA provides limited authority for satellite companies to offer distant digital television signals if certain conditions are met.

What Is Digital Television?

Digital television (DTV) is a new television service representing the most significant development in television technology since the advent of color television in the 1950s. DTV can provide sharper pictures, a wider screen, CD-quality sound, better color rendition, multiple video programming or a single program of high definition television (HDTV), and other new services currently being developed. DTV can be HDTV, or the simultaneous transmission of multiple programs of standard definition television (SDTV), which is a lesser quality picture than HDTV but significantly better than today's television. Or, alternately, DTV could deliver as part of a multiple offering, some other service such as the distribution of text or data (for example, electronic newspapers or stock quotes) or even a high speed connection to the Internet.

The rationale often cited for the digital transition is that aside from offering superior broadcast quality to consumers, DTV will allow over-the-air broadcasters to offer the same kinds of digitally-based services (such as pay-per-view or high-speed Internet) currently offered by cable and satellite television providers. Additionally, it is argued that digital television uses the radiofrequency spectrum more efficiently than traditional analog television, thereby conserving a scarce resource (bandwidth) that can be used for other wireless applications.

There are three major components of DTV service that must be present in order for consumers to enjoy a fully realized "high definition" television viewing experience. *First*, digital programming must be available. Digital programming is content produced with digital cameras and other digital production equipment. Such equipment is distinct from what is currently used to produce conventional analog programming. *Second*, digital programming must be delivered to the consumer via

a digital signal. Digital signals can be broadcast over the airwaves (requiring new transmission towers or DTV antennas on existing towers), transmitted by cable or satellite television technology, or delivered by a prerecorded source such as a digital video disc (DVD).[1] And *third*, consumers must have a digital television product capable of receiving the digital signal and displaying digital programming on their television screens. To receive digital broadcast signals, consumers can buy digital monitors accompanied with a set-top converter box (a digital tuner),[2] or alternatively, an integrated digital television with digital tuning capability already built in.

Role of Congress and the FCC

Congress and the Federal Communications Commission (FCC) have played major roles in the development of DTV. Starting in 1987, the FCC launched a decade-long series of proceedings exploring the potential and feasibility of a transition from conventional analog televisions to advanced television systems. While the original term used to describe the new television system was high definition television (HDTV), the FCC used a broader term — advanced television (ATV) — referring to any television technology that provides improved audio and video quality. After it became clear that ATV would be using digital signal transmission, the FCC began (in 1995) to use the term DTV (synonymous with ATV) to describe the new service more accurately.

In December 1996, after lengthy debate between television manufacturers, broadcasters, and computer firms, the FCC adopted a standard for DTV signal transmission based on recommendations of the Advanced Television System Committee (ATSC).[3] The ATSC standard allows for 18 different video formats, of which four have subsequently been adopted for commercial use.[4]

Meanwhile, the Telecommunications Act of 1996 (P.L. 104-104) provided that initial eligibility for any DTV licenses issued by the FCC should be limited to existing broadcasters. Broadcasters would be issued DTV licenses while at the same time retaining their existing analog licenses during the transition from analog to digital television. The act provided that broadcasters must eventually return either their existing analog channel or the new digital channel. Also in the 104th Congress,

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[1] At present, commercially available DVD technology does not deliver digital high definition programming.

[2] Set-top converter boxes can also be used to enable conventional analog televisions to receive digital signals over the air. However, analog televisions hooked up to digital tuners cannot display high definition pictures.

[3] *FCC Fourth Report and Order In the Matter of Advanced Television Systems and Their Impact on Existing Television Service*, MM Docket No. 87-268, FCC 96-493, released December 27, 1996.

[4] Four video formats are being used commercially by U.S. television producers and manufacturers. These four formats are described by the number of lines they produce per each picture frame, and whether they use interlaced (i) or progressive (p) scanning techniques. These are: 480i and 480p (suitable for SDTV broadcasts), and 720p and 1080i (HDTV). The progressive scan video format is more compatible with PC displays, while the interlaced scan is more compatible with analog television receivers.

a major debate took place over whether to direct the FCC to conduct auctions for the spectrum allocated for DTV. The FCC estimated the commercial value of the DTV spectrum to be between $11 billion to $70 billion. No legislation was enacted, however, and the FCC did not obtain the authority to auction the DTV licenses.

In 1997, the FCC adopted rules[5] to implement the Telecommunications Act, and granted DTV licenses to some 1600 full power incumbent television broadcasters.[6] The DTV licenses consist of 6 megahertz (MHz) of unused spectrum within the VHF and UHF frequency bands. Because DTV signals cannot be received through the existing analog television broadcasting system (known as NTSC[7]) the FCC decided to phase in DTV over a period of years, so that consumers would not have to immediately purchase new digital television sets or converters. Thus, broadcasters were given 6 MHz of new spectrum for digital signals, while retaining their existing 6 MHz for analog transmission so that they can simultaneously transmit NTSC and DTV signals to their broadcasting market areas.[8] The simultaneous broadcasting ("simulcasting") of the same programs in both digital and analog modes was intended to allow viewers who have not yet purchased DTV sets or converters to continue to receive television programming during the transition to DTV.

The ruling required television stations receiving the DTV licenses to build their DTV facilities according to a schedule determined by the size of their markets. Table 1 shows the time line established by the FCC for DTV conversion. The FCC has granted extensions to licensees unable to meet the schedule due to unforeseeable or uncontrollable circumstances, such as an inability to secure tower locations for new antennas.

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[5] *FCC Fifth Report and Order In the Matter of Advanced Television Systems and Their Impact on Existing Television Service*, MM Docket No. 87-268, FCC 97-116, released April 21, 1997.

[6] A provision in the Public Health Security and Bioterrorism Preparedness and Response Act of 2002 (P.L. 107-188, H.R. 3448, H.Rept. 107-481) addresses the digital conversion of full power television stations that received their analog licenses *after* the FCC allocated digital spectrum to existing analog stations in 1997. Section 531 requires the FCC to allot a digital channel to any requesting full-power television station that had an application pending for an analog television station construction permit as of October 24, 1991, and which had its application granted after April 3, 1997. Any station receiving digital spectrum under this provision is required to complete construction of its digital facility within 18 months, without the possibility of an extension. Stations are also prohibited from operating an analog signal on its designated digital channel. The bill's conference report states that this provision will allow recent broadcast licensees to foster a digital audience during the transition period to digital television without having to terminate analog service, and that without this change, those stations would be denied the flexibility to operate an analog and a digital facility simultaneously in the near term, especially in major markets.

[7] The National Television Systems Committee (NTSC) was the industry group that developed the currently used U.S. television standards. For a discussion of the difference between analog and digital signals, see CRS Report 96-401, *Telecommunications Signal Transmission: Analog vs. Digital*.

[8] Using digital technology, the DTV frequencies can be placed in the vacant portion of the same spectrum band currently allocated for analog (NTSC) television without interfering with analog television broadcasts.

Table 1. Digital Conversion Schedule for Television Stations

Stations	Conversion Deadline
affiliates of the four major networks in the top 10 markets.[9]	May 1, 1999
affiliates in markets 11-30	November 1, 1999
rest of all commercial television stations in the smaller markets	May 1, 2002
noncommercial television stations	May 1, 2003

The FCC set a target date of 2006 for broadcasters to cease broadcasting the analog signal and return their existing analog television spectrum licenses to be auctioned for other commercial purposes. During the 105th Congress, the Balanced Budget Act of 1997 (P.L. 105-33) made the 2006 reversion date statutory, providing that a "broadcast license that authorizes analog television service may not be renewed to authorize such service for a period that extends beyond December 31, 2006." However, the act requires the FCC to grant extensions for reclaiming the analog television licenses in the year 2006 from stations in television markets where any one of the following three conditions exist:

- if one or more of the television stations affiliated with the four national networks are not broadcasting a digital television signal;
- if digital-to-analog converter technology is not generally available in the market of the licensee; or
- if at least 15% of the television households in the market served by the station do not subscribe to a digital "multi-channel video programming distributor" (including cable or satellite services) and do not have digital TV sets or converters.

The FCC continues to monitor the status of the DTV conversion of both commercial and noncommercial broadcast stations. On October 11, 2001, FCC Chairman Michael Powell announced the creation of an FCC Digital Television (DTV) Task Force to review the ongoing transition to DTV, and to make recommendations on how to facilitate the transition and promote the rapid recovery of broadcast spectrum for other uses.

The FCC is issuing periodic progress reports on the DTV buildout,[10] and has the option of granting deadline extensions to broadcasters. On November 8, 2001, the FCC announced it would modify a number of its DTV transition rules, in order to facilitate and speed the DTV transition. The changes permit stations to initially build lower-powered (and less expensive) DTV facilities, while retaining their option to expand their coverage area as the digital transition progresses. Meanwhile, the FCC

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[9] The top ten television markets (in terms of advertising revenue), in order, are New York, Los Angeles, Chicago, Philadelphia, San Francisco-Oakland, Boston, Dallas-Fort Worth, Washington DC, Atlanta, and Detroit.

[10] The most recent progress report is contained in: *Second Report and Order and Second Memorandum and Order*, MM Docket No. 00-39, August 9, 2002, FCC 02-230, 41 p.

declined to issue a blanket extension of remaining DTV construction deadlines. However, the FCC will consider, in limited circumstances, individual requests for extensions due to financial hardship. Specifically:

> Stations seeking an extension of time to construct DTV facilities on this basis must provide detailed evidence that the cost of meeting the minimum buildout requirements exceeds the station's financial resources . . . a brief downturn in the economy or advertising revenues will not be considered a sufficient showing of financial hardship. Rather, the showing must reflect the particular station's financial status over an economically significant period of time. In addition, the applicant must provide detailed evidence of its good faith efforts to met the deadline, including its efforts to obtain the necessary financing.[11]

Approximately three-quarters of the 1,240 full-power commercial stations in the United States did not meet the May 1, 2002 conversion deadline.[12] Most have received six-month deadline extensions from the FCC. On May 16, 2002, the FCC adopted a Notice of Proposed Rulemaking (NPRM) which proposes increasingly severe sanctions every six months on stations who have not constructed digital facilities and do not demonstrate that their failure to do so was either unforeseeable, beyond their control, or due to legitimate financial hardship. Sanctions progress from admonishment, to issuance of a notice of apparent liability for forfeiture, to rescission of the station's DTV license.[13]

On April 4, 2002, FCC Chairman Michael Powell submitted, to the Chairmen of the House Energy and Commerce Committee and the Senate Commerce, Science, and Transportation, a proposal for voluntary industry actions to speed the digital television transition. The proposal, which is purely voluntary, is intended (in Commissioner Powell's words) "to provide an immediate spur to the transition by giving consumers a reason to invest in digital technology *today*, while we continue to work on resolving the longer-term issues."[14]

On August 8, 2002, the FCC announced actions intended to further encourage the roll-out of DTVs by the December 31, 2006 target completion date. Specifically, the FCC adopted a Second Report and Order and Second Memorandum Opinion and Order (FCC 02-230) which requires television receivers and receiving equipment (such as VCRs and DVD players/recorders) to include DTV reception capability (see section in this report, "Mandating Digital Tuners" for further details).

On September 10, 2003, the FCC adopted a Second Report and Order which adopts, with certain modifications, an agreement between the cable and consumer electronics industries ensuring the compatibility between cable systems and

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[11] FCC News Release, "FCC Acts to Expedite DTV Transition and Clarify DTV Buildout Rules, November 8, 2001.

[12] See General Accounting Office, *Telecommunications: Many Broadcasters Will Not Meet May 2002 Digital Television Deadline*, GAO-02-466, April 2002.

[13] See [http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-222561A4.pdf].

[14] For proposal and cover letters to committees, see: [http://www.fcc.gov/commissioners/powell/mkp_proposal_to_speed_dtv_transition.pdf].

commercial electronics devices (see section in this report, "Cable/DTV Interoperability Standards."

On November 4, 2003, the FCC adopted a Report and Order and Further Notice of Proposed Rulemaking (FCC 03-273) which gives broadcasters the option of inserting a "broadcast flag" into their over-the-air broadcast transmissions (see section in this report, "Copyright Protection Technology" for further information). The FCC is planning to adopt additional major orders intended to hasten the DTV transition. One will address the carriage of DTV broadcast signals on cable and satellite TV systems.

On January 27, 2003, the FCC initiated its Second Periodic Review of the DTV transition. The Notice of Proposed Rulemaking (FCC 03-8) seeks comment on a number of issues related to the DTV conversion.[15] Included in the NPRM is the issue of how the FCC will determine whether 85% of American households have access to digital signals by 2006. The NPRM also reopens the issue of public interest obligations of DTV broadcasters.

On August 4, 2004, the FCC adopted a Report and Order (FCC-04-192) which implements several steps identified in the Second Periodic Review. These include commencing an open channel election process, establishing deadlines for broadcasters to increase power, and resolving outstanding operational issues.[16]

On October 4, 2004, the FCC announced a DTV consumer education initiative. The FCC announced a new website – [http://www.dtv.gov] – which is intended as a comprehensive source of information for consumers on the DTV transition.

Status of the DTV Buildout

The nationwide buildout of digital television is a complex and multifaceted enterprise. A successful buildout requires: the development by content providers of compelling digital programming; the delivery of digital signals to consumers by broadcast television stations, as well as cable and satellite television systems; and the widespread purchase and adoption by consumers of digital television equipment.

Creation of Digital Programming. Digital programming is created with digital cameras and other digital production equipment. Digital content tends to favor more "visual" types of programming — such as sports events or movies — which take full advantage of the high-definition viewing experience. Currently, the amount of available digital programming is limited, but gradually becoming more widespread. Among broadcast networks, CBS produces the largest amount, with digital high-definition broadcasts available in all of its prime time scripted entertainment series, as well as many of its national sports broadcasts. ABC is

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[15] See Notice of Proposed Rulemaking, *Second Periodic Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television*, MB Docket No. 03-15, FCC 03-8, Jan. 27, 2003.

[16] FCC News Release, "FCC Takes Next Steps to Promote Digital TV Transition," August 4, 2004.

offering HDTV broadcasts in nearly all of its prime time schedule and in some of its sports broadcasts. PBS has also been active, producing digital programming as well as offering multicasts over digital channels in some local markets. NBC and FOX are offering digital programming as well (although not necessarily in high definition), and FOX plans to transmit at least 50% of its prime time schedule in HDTV by the 2004-2005 season. Cable networks producing (or planning to produce) digital programming include HBO, Showtime, A&E, Discovery, ESPN, Bravo, Cinemax, HDNet, In Demand, and Madison Square Garden.[17]

Two factors generally inhibit content providers from accelerating the production of digital programming. First, because relatively few households have digital televisions, networks have a diminished incentive to invest the money to produce digital content. Some digital programming is being produced by networks in sponsorship/partnership with consumer electronics companies who manufacture digital televisions. Second, content providers (e.g. networks and movie studios) are reluctant to provide digital programming until a digital copyright standard is in place (see discussion below, under "Issues").

Delivery of Digital Signals. Currently, there are three ways digital programming is being delivered to consumers. Digital signals are: 1) broadcast over the airwaves; 2) transmitted over channels provided by satellite television systems; and 3) provided via digital cable service in a growing number of markets.

Broadcasting. According to the National Association of Broadcasters (NAB), as of January 4, 2005, there were 1,344 stations (both commercial and public) broadcasting digital signals in 211 markets.[18] This represents about 84% of the nation's approximately 1,600 television stations. The 211 markets currently receiving digital transmissions cover over 99% of U.S. TV households. Television stations must construct new facilities and purchase new equipment in order to transmit digital signals. According to NAB, costs range from $8-10 million to fully convert a station to digital operation.[19] NAB estimates that the total cost of the transition for broadcasters is $10 to $16 billion.[20]

As of November 30, 2004, the FCC has granted a construction permit or license to 1,674 stations, about 97% of the total number of DTV allotments.[21] Approximately three-quarters of the 1,240 full-power commercial stations did not meet the May 1,

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[17] Cable & Telecommunications Overview, 2001, June 2001, National Cable Television Association.

[18] For latest statistics, see [http://www.nab.org/newsroom/issues/digitaltv/dtvstations.asp].

[19] Testimony of Ben Tucker, Chairman of NAB Television Board, in: U.S. Congress, House, "Digital Television: A Private Sector Perspective on the Transition," Hearing Before the Committee on Energy and Commerce, Subcommittee on Telecommunications and the Internet, March 15, 2001, 107th Cong., 1st Sess., p. 72.

[20] Testimony of Edward O. Fritts, NAB President and Chief Executive Officer, before the House Committee on Energy and Commerce, Subcommittee on Telecommunications and the Internet, June 2, 2004.

[21] See [http://www.fcc.gov/mb/video/files/dtvsum.html].

2002 conversion deadline. A total of 843 commercial stations requested from the FCC an extension of the May 2002 deadline in order to complete construction of their DTV facilities. So far, 772 have been granted and 71 have been admonished. Of those stations granted extensions, 602 filed requests for second extensions. Of this number, 535 extension requests have been granted, 67 have been dismissed, and the rest remain pending. A third extension was requested by 141 stations; 104 extensions were granted, action was deferred for 30 satellite stations, and 7 stations were admonished. Meanwhile, 214 noncommercial educational stations requested extension of the May 1, 2003 buildout deadline. The FCC has granted all of those extension requests; 134 stations filed for second extensions with 129 granted.[22]

Satellite. Satellite television is currently provided to over 22 million American households. Two major companies offer direct broadcast satellite (DBS) television service in the United States: Echostar's DISH Network and Hughes' DirecTV. Hughes and Echostar offer eight and nine high definition channels, respectively. Neither service offers local high definition broadcast channels in most markets. Another company, Rainbow DBS (a subsidiary of Cablevision), offers thirty-nine high definition channels through a service called Voom.[23] Satellite TV customers need added equipment (a slightly bigger satellite dish and either a set-top box or built-in satellite HDTV reception capability) in order to receive high-definition programming on their digital televisions.

Cable. Initially, cable companies had been reluctant to carry channels of digital and high definition programming (thereby displacing some existing channel offerings) until more consumers have the digital television equipment necessary to view digital programming (see discussion of "must carry" below).[24] Also there are copyright, standards, and interoperability issues between the cable system and DTV sets that must be resolved (see "copyright and standards" below).

The reluctance of cable companies to carry digital programming has changed, however, as cable providers in several markets have begun to implement plans to carry digital or high-definition channels. On May 1, 2002, the nation's top ten cable companies pledged to implement FCC Chairman Powell's voluntary plan, which calls on cable operators to carry digital signals of up to five broadcast or other digital

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[22] Ibid.

[23] Testimony of Richard DalBello, President, Satellite Broadcasting & Communications Association, hearing before the Committee on Energy and Commerce, Subcommittee on Telecommunications and the Internet, June 2, 2004.

[24] Many cable (and both DBS commercial services) are "digital." However, "digital cable"generally refers to technology which converts analog programming to a digital signal which is transmitted to the consumer and then converted back to analog form for television viewing. "Digital cable" allows cable companies to provide more channels, as well as high speed (broadband) Internet service. However, the "digital" signals transmitted over cable systems use different digital standards than the DTV standard used by broadcasters and current DTV sets; therefore current digital cable services currently cannot be directly received by DTV sets.

programming services by January 1, 2003.[25] According to the National Cable & Telecommunications Association (NCTA), as of September 2004, consumers in 177 (out of 210) local TV markets can now receive a package of HDTV services from their cable operator. Cable systems providing HDTV pass 90 million U.S. television households (out of a total 108 million) and reach all 100 of the biggest TV markets.[26]

Consumer Purchase of DTV Products. DTV products are now available from several manufacturers that offer varying features and technical characteristics. Currently, most consumers who purchase DTV products are purchasing digital television monitors, available at prices ranging from about $500 to $1,000, depending on screen size and other features. Digital monitors are primarily being used by consumers to watch DVDs,[27] regular analog television, and digital programming over a cable or satellite television system. A digital monitor must be coupled with a set-top digital receiver or tuner (costing in the range of $300 to $500) in order to receive digital broadcast signals.[28] An integrated DTV, which contains a built-in digital tuner, is sold at prices ranging from about $1,000 to $10,000. Over the past several years, prices for DTV monitors and receivers have dropped markedly. As the market for DTVs expands, prices are expected to decrease further.[29]

According to the Consumer Electronics Association (CEA), DTV sales (from suppliers to retail outlets) totaled 2.8 million units in the first half of 2004, about an 80% increase over the first half of 2003. The total number of DTV products sold since 1998 stands at 11.7 million. Additionally, approximately 1.2 million over-the-air digital television tuners (either stand-alone set-top boxes or integrated within the DTV set) have been sold, factory to dealer, since 1998.[30] CEA forecasts that 5.7

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[25] McConnell, Bill, "Cable Takes the High-Def High Road," *Broadcasting & Cable*, May 6, 2002, pp. 54-60.

[26] National Cable & Telecommunications Association, "Consumers in 177 Markets Across the U.S. – Including all of the Top 100 – Can Now Receive HDTV Over Cable," Press Release, September 27, 2004.

[27] Commercially available DVD technology does not yet support digital programming. However, current DVDs viewed over a DTV provide a significantly higher quality picture than DVDs viewed over regular analog televisions.

[28] Many consumers are asking whether their current analog TV sets will become obsolete with the advent of DTV. Consumers can continue to use analog TV sets until the broadcasters return the analog TV licenses to the FCC, after which, a set-top digital converter box could be used to enable the analog TV set to receive the DTV signal. Digital converters, however, will only enable the display of pictures comparable in quality to existing sets. They will not provide HDTV-quality images, or other new services that may come with DTV.

[29] Testimony of David Arlin, Thomson Multimedia Inc. on behalf of the Consumer Electronics Association, in: U.S. Congress, House, "Digital Television: A Private Sector Perspective on the Transition," Hearing Before the Committee on Energy and Commerce, Subcommittee on Telecommunications and the Internet, March 15, 2001, 107th Cong., 1st Sess., p. 47.

[30] Consumer Electronics Association, Press Release, "2003 a Banner Year for DTV," January 12, 2004, available at

(continued...)

million digital television units will be sold in 2004, 9.4 million in 2005, 15.6 million in 2006 and 23 million in 2007.[31] While growth has occurred, the penetration of DTVs into the American home remains relatively small, with approximately 10% of the 110 million American households having DTVs, and about 1% having the ability to receive digital over-the-air signals.

Policy Issues

While the nation's transition to digital television is proceeding, industry analysts believe that widespread adoption of DTVs by consumers will not be achieved by 2006, and that television stations will continue to broadcast both analog and digital signals past the 2006 deadline. The key issue for Congress and the FCC is: what steps, if any, should be taken by government to further facilitate a timely, efficient, and equitable transition to digital television? To address this question, Congress and the FCC must confront a highly complex policy landscape, involving different industries, technologies, and interests, including content providers, commercial and noncommercial television broadcasters, cable and satellite television providers, consumer electronics manufacturers and retailers, and consumers.

Currently the three critical components of the digital transition — programming and content, delivery of a digital signal, and consumer purchase of DTVs — appear to be lagging and hindered by what many describe as a "chicken or egg" dynamic. Most consumers are reluctant to buy DTVs until there is more high quality digital programming to watch. Content providers have a diminished incentive to create digital programming until a larger number of consumers are capable of receiving digital television service. And television service providers (especially cable and satellite) have little incentive to provide digital programming until more consumers have DTVs and content providers supply more digital programming.

Broadcasters are currently under a statutory mandate to convert, with the expectation that the presence of digital broadcast signals will provide sufficient market incentives for other stakeholders to go digital. Much of the policy debate revolves around the question of whether this strategy will yield a timely, efficient, and equitable digital transition. If not, should conversion deadlines be extended, or should additional government mandates — such as digital "must carry" or digital tuners — be placed on other stakeholders in order to accelerate the pace of the transition? Conversely, would further government intervention in the digital transition produce undesirable market distortions? The following discusses a number of specific policy issues related to the transition to digital television.

Reclaiming the Analog TV Spectrum. The goal of the FCC and Congress has always been to complete the transition to DTV as quickly as possible, so that NTSC (analog) spectrum can be reclaimed and reallocated for other purposes. Some

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[30] (...continued)
[http://www.ce.org/press_room/press_release_detail.asp?id=10396].

[31] Testimony of Gary Shapiro, President and CEO Consumer Electronics Association, before the House Subcommittee on Telecommunications and the Internet, Committee on Energy and Commerce, June 2, 2004.

of the NTSC spectrum will be auctioned for commercial wireless services, and some of it will be used for new public safety services (the FCC has already designated some of the analog TV spectrum for public safety use).

The current target date for broadcasters to return analog spectrum is December 31, 2006. However, the Balanced Budget Act of 1997 allows a station to delay the return of the analog spectrum if 15% or more of the television households in its market do not subscribe to a multi-channel digital service and do not have digital television sets or converters. Given the slower-than-expected pace that digital televisions have been introduced into American homes, few observers believe that the goal of digital televisions in 85% of American homes by 2006 will be reached.[32] Thus, some observers are concerned that if digital television does not sufficiently penetrate American homes in the near future, the analog spectrum will not be reclaimed, and broadcasters will keep both analog and digital television spectrum licenses indefinitely, thereby preventing spectrum from being available for commercial wireless services and public safety applications (for example, police and firefighter radio communications).

Some have urged Congress to require broadcasters to return the analog spectrum on "a date certain." Under this approach, spectrum would be freed up for other uses. Among legislation in the 108th Congress, the HERO Act (H.R. 1425 and within 9/11 Commission omnibus bills H.R. 5024, H.R. 5040, and S. 2774) would prohibit any delay in reassigning the 24 MHz for public safety purposes, and require those frequencies to be operational by January 1, 2007. The Spectrum Commons and Digital Dividends Act of 2003 (H.R. 1396) requires the FCC to ensure that any rules necessary to effectuate the timely transition to digital television are promulgated and completed prior to making available 700 MHz bands to commercial wireless services.

Meanwhile, at the request of Representative Edward Markey, Ranking Minority Member of the House Subcommittee on Telecommunications and the Internet, the General Accounting Office (GAO) prepared a report on the digital transition entitled, *Additional Federal Efforts Could Help Advance Digital Television Transition*. Released in November 2002, the GAO report found that few consumers own digital television equipment, that many consumers are unaware of the DTV transition, and that cable and satellite carriage of DTV signals is limited. Concluding that it is unlikely that 85% of households will be able to receive DTV signals by December 2006, GAO recommended that the FCC: explore options to raise public awareness about the DTV transition; examine the costs and benefits of mandating that all new televisions be digital cable-ready; and examine the advantages and disadvantages of setting a fixed date for transferring must-carry rights from broadcasters' analog signals to digital signals.[33]

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[32] Historically , consumer electronics products take many years to be adopted. Since its introduction in 1953, color television took roughly 25 years to enter 85% of American homes. The video cassette recorder (VCR) took 15 years to reach 85% of homes.

[33] General Accounting Office, *Additional Federal Efforts Could Help Advance Digital Television Transition*, GAO-03-7, November 2002, 52 p. Available at [http://www.gao.gov/

During March and April 2004, another digital transition proposal was informally circulated by the Media Bureau of the FCC.[34] Under this proposal, the transition deadline would be moved from 2006 to 2009. Cable and satellite providers would be required to carry a broadcaster's digital signal only, but could — if the broadcaster so chooses — down-convert the digital signal to an analog signal that cable or satellite customers could watch on their analog televisions. Under this scenario, according to the Media Bureau proposal, cable and satellite TV households watching down-converted digital signals on their analog sets would be counted toward the 85% statutory threshold required in order for broadcasters to return to the government their valuable analog spectrum, which can then be auctioned and/or assigned for other purposes. Given that cable and satellite television households currently comprise 88% of all television households, it is likely that the 85% threshold will be satisfied in most areas. Subsequently, analog spectrum would be reclaimed and analog television sets would no longer be able to receive over-the-air television broadcasts unless they are equipped with a converter box.

The broadcasting industry has expressed strong opposition to the Media Bureau's proposal.[35] According to the broadcasters, the proposal would discourage the development of digital television services (such as HDTV and multicasting) and remove the incentive for consumers to purchase DTVs. Additionally, they argue, if analog spectrum is reclaimed under the Media Bureau proposal, the 12% of TV households that are exclusively "over-the-air" — many of whom are economically disadvantaged — would lose their television service altogether unless they purchased DTVs, converter boxes, or cable or satellite television subscriptions. In response to these criticisms, Kenneth Ferree, head of the Media Bureau, argues that the development of digital services will not be adversely impacted because market forces will ensure that popular stations will likely be carried by cable and satellite TV providers in both digital and analog form by 2009. Additionally, suggests Ferree, economically disadvantaged over-the-air households could receive federal subsidies (derived from reclaimed spectrum auction proceeds, for example) for purchasing converter boxes, thereby ensuring that these households will continue to receive television service.[36]

On May 27, 2004 the FCC Media Bureau invited comments from the public on the issue of how to minimize the disruption to consumers when the switch-over to digital broadcasting occurs.[37] Specifically, the FCC sought comments on whether market forces or private sector measures were adequate to address consumer

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[33] (...continued)
new.items/d037.pdf].

[34] The Media Bureau's digital transition proposal has not yet been released as a formal document.

[35] Written Ex Parte Submission in MB Docket Nos. 03-15 & 98-120, April 15, 2004, Available at
[http://www.nab.org/Newsroom/PressRel/Filings/LetterReFerreePlan041504.pdf].

[36] Boliek, Brooks, "Feds: No analog TV by '09," *Hollywood Reporter*, April 15, 2004.

[37] *FCC Public Notice*, "Media Bureau Seeks Comment on Over-the-Air Broadcast Television Viewers," MB Docket No. 04-210.

disruption, or whether government action (such as converter box subsidies, for example) may be necessary.

On July 22, 2004, the National Commission on Terrorist Attacks Upon the United States (the 9/11 Commission) released its final report. The Commission recommended that Congress support legislation "which provides for the expedited and increased assignment of radio spectrum for public safety purposes." In response to this recommendation, on September 21, 2004, Senator John McCain introduced S. 2820, the SAVE LIVES Act. S. 2820 would change the digital transition deadline from December 31, 2006 to December 31, 2008. Spectrum for public safety would be freed for use by first responders, and other spectrum would be available for commercial uses. Proceeds from the auctioning of commercial spectrum would be credited to a Digital Transition Consumer Assistance Fund. The Fund would be used to establish a $1 billion digital transition program, administered by the Secretary of Commerce, which would subsidize consumers who continue to rely exclusively on over-the-air broadcasts with analog televisions. The program would give priority to low-income households, and would provide assistance for purchasing digital-to-analog converter boxes or other technologies which would allow consumers to continue receiving television signals.

During the September 22, 2004 markup of S. 2820 in the Senate Committee on Commerce, Science and Transportation, an amendment was offered by Senator Conrad Burns which sets a digital transition deadline (December 31, 2007) *only* for spectrum that has been designated for public safety, and provides that the FCC may waive the deadline in a given market "to the extent necessary to avoid consumer disruption while ensuring the ability of relevant public safety entities to use such frequencies." The Burns amendment was subsequently adopted by the Committee.

On September 29, 2004, Senator McCain offered a modified version of S. 2820 as an amendment to the National Intelligence Reform Act of 2004 (S. 2845). As in Committee, Senator Burns offered a modifying amendment to the McCain amendment. At the request of Senator McCain, the Senate approved by unanimous consent the McCain amendment as modified by the Burns amendment. The final version adopted into S. 2845 sets the digital transition deadline of December 31, 2007 only for spectrum that has been designated for public safety. Language regarding the FCC's authority to waive the deadline to avoid consumer disruption was modified to read: "only if all relevant public safety entities are able to use such frequencies free of interference by December 31, 2007, or are otherwise able to resolve interference issues with relevant broadcast licensee by mutual agreement."[38] The Senate passed S. 2845 on October 6, 2004. The House-passed version of S. 2845 (passed on October 16, 2004) contains a nonbinding provision (Section 5011) expressing the "sense of the Congress" that the 85% penetration test should be eliminated and that broadcasters should be required to cease analog transmissions by December 31, 2006 in order that analog spectrum can be returned for public safety and commercial uses.

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[38] For more information on this issue, see CRS Report RL32622, *Public Safety, Interoperability and the Transition to Digital Television*, by Linda K. Moore.

The final conference report for S. 2845 (H.Rept. 108-796) contains a digital television provision similar to the House language. Section 7501 states that it is the sense of Congress that "Congress must act to pass legislation in the first session of the 109th Congress that establishes a comprehensive approach to the timely return of analog broadcast spectrum as early as December 31, 2006" and that any delay in the adoption of such legislation will "delay the ability of public safety entities to begin planning to use this needed spectrum." The Intelligence Reform and Terrorism Prevention Act of 2004 (P.L. 108-458) was signed into law on December 17, 2004.

Digital "Must Carry" Debate. Responding to the debate between the broadcast and cable industries over whether cable TV providers should be required to transmit DTV programming, in July 1998 the FCC initiated a proceeding on the matter.[39] Under the "must carry" provisions of the Cable Television Consumer Protection and Competition Act of 1992, cable TV providers are required to transmit local analog programs to their customers. This decision was based on the reasoning that since cable TV has a predominant position in the market, "without mandatory carriage provisions, the economic viability of local broadcast television and its ability to produce quality local programming would be jeopardized."[40]

The broadcasters (primarily the smaller networks and independent stations, represented by the Association of Local Television Stations, but also the National Association of Broadcasters) believe that the same principles and conclusions of the 1992 Act should apply to DTV services, leading to mandatory carriage of the DTV programming by cable operators. Broadcasters argue that because most Americans (about 65%) receive their TV via cable, the carriage of DTV programming by cable providers is essential for consumers to purchase DTV receivers.

The cable companies (led by the National Cable Television Association, NCTA) oppose any "must carry" requirements for cable operator carriage of DTV programming, arguing that it would be an unlawful taking of their property, and that they should be able to decide what content they provide on their own networks. NCTA points out that, unlike the broadcasters who were given free spectrum licenses for DTV, cable operators must build their own infrastructure to be able to transmit DTV signals. Cable operators say they will carry broadcasters' DTV programming as soon as consumer demand warrants it. Cable television services provide a finite number of channels to consumers, and any mandate to provide DTV programming would require cable companies to remove other non-broadcast channels. Many cable operators are investing in the upgrades needed to provide DTV, although the video transmission standards adopted by cable operators may not be the same as those used by the broadcasters. This could mean that different home equipment may be necessary for cable services than for over-the-air TV reception. In addition, HDTV programming will require cable operators to build a more robust transmission (i.e.,

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[39] *FCC Notice of Proposed Rule Making on Carriage of Transmissions of Digital Television Broadcast Stations*, CS Docket No. 98-120, released July 10, 1998.

[40] *Ibid*., p. 5. Satellite television is also subject to must carry requirements. See CRS Report RS20425, *Satellite Television: Provisions of the Satellite Home Viewer Improvement Act and the Launching Our Communities Access to Local Television Act, and Continuing Issues*, by Marcia S. Smith.

greater bandwidth) capability than is required by SDTV, and some cable operators may want to offer SDTV but not HDTV services. The cable industry also contends that mandating carriage of all DTV broadcast transmissions will financially devastate many smaller cable operators.

On January 22, 2001, the FCC announced its adoption of rules for cable carriage of digital TV signals. Most notably, the FCC ruling does **not** require cable systems to simultaneously carry both the analog and digital signals ("dual carriage") of local TV stations. The FCC tentatively concluded that "such a requirement appears to burden cable operators' First Amendment interests more than is necessary to further a substantial governmental interest."[41] A Further Notice of Proposed Rulemaking (FNPRM) will continue to collect public comment and investigate this issue.[42]

While not approving a dual carriage mandate, the FCC did rule that a digital-only TV station, whether commercial or non-commercial, can immediately assert its right to carriage on a local cable system. Additionally, a TV station that returns its analog spectrum and converts to digital operations must be carried by local cable systems. Cable systems must carry "primary video," defined as a "single programming stream and other program-related content." The FNPRM will define the scope of "program-related content."

Digital multi casting refers to the ability of broadcasters to divide their 6 MHz of digital spectrum into separate and discrete streams of content. Thus, for example, a broadcaster could transmit alternate channels of programming, data, or interactive services in addition to its primary video broadcast. At issue is whether cable operators should be required to carry any or all multicasted channels transmitted by broadcasters as part of their 6 MHz digital allotment.

Mandating Digital Tuners. Currently, about 1% of American households have purchased DTVs equipped or accompanied with digital tuners that can receive over-the-air digital broadcast signals. Some groups (for example, broadcasters) advocate a government mandate that would require new televisions to contain built-in digital tuners.

A study conducted by Arthur D. Little (and commissioned by the National Association of Broadcasters and the Association of Maximum Service Television) estimates that DTV set penetration would reach 75.5% by 2006, if the FCC were to mandate that all new sets sold after January 1, 2004 have DTV reception capability. Supporters of a mandate argue that requiring digital tuners would ensure a quicker penetration of DTVs into American households, thereby giving digital content providers and distributors greater incentive to produce and transmit digital content.

Consumer electronics manufacturers and many consumer advocates oppose a digital tuner mandate, arguing that it would raise prices of television sets beyond the

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[41] See [http://www.fcc.gov/Bureaus/Cable/News_Releases/2001/nrcb0103.html].

[42] *Federal Register*, March 26, 2001 (Volume 66, Number 58), pp. 16523-16532.

means of many consumers.[43] Opponents also dispute whether a digital tuner mandate would effectively hasten the DTV transition, since most households currently receive their primary television service via cable or satellite and therefore may not require an over-the-air digital reception capability. Finally, they argue that a digital tuner mandate would constitute an inappropriate, unnecessary, and counterproductive government intervention into an increasingly dynamic digital television marketplace.

On August 8, 2002, the FCC adopted a phase-in plan requiring most new television sets to contain digital tuners by 2007. Specifically, the FCC's Second Report and Order and Second Memorandum Opinion and Order (FCC 02-230) requires all television sets with screen sizes of at least 13 inches, and all television receiving equipment (such as video cassette recorders and DVD players/recorders to include DTV reception capability according to the following schedule:

Receivers with screen sizes 36 inches and above — 50% of a responsible party's units must include DTV tuners effective July 1, 2004; 100% of such units must include DTV tuners effective July 1, 2005.
Receivers with screen sizes 25 to 35 inches — 50% of a responsible party's units must include DTV tuners effective July 1, 2005; 100% of such units must include DTV tuners effective July 1, 2006.
Receivers with screen sizes 13 to 24 inches — 100% of all such units must include DTV tuners effective July 1, 2007.
TV Interface Devices VCRs and DVD players/recorders, etc. that receive broadcast television signals — 100% of all such units must include DTV tuners effective July 1, 2007.

The FCC's phase-in plan is strongly opposed by the Consumer Electronics Association (CEA), consumer groups, and antitax groups. The CEA, citing the "scant percentage of households relying on over-the-air television reception" argues that the mandate is a "multi-billion dollar TV tax on American consumers," and calls instead for an FCC mandate on cable-DTV compatibility standards.[44] This position is countered by the National Association of Broadcasters, who argue that the mandate is necessary to hasten the DTV transition and ensure the survival of free over-the-air broadcasting, which NAB says is currently received by roughly one third of all TV sets in use. NAB also argues that some consumer electronics companies, such as Zenith and Thomson, support phased-in integration of digital tuners.[45] The House Energy & Commerce Committees staff discussion draft would affirm the FCC's phase-in plan for digital tuners. Conversely, the TV Consumer Choice Act of 2003 (H.R. 426), introduced by Representative James Sensenbrenner on January 28, 2003, would prohibit the FCC from requiring digital television tuners.

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[43] Estimated at an initial cost of $200 per set (see April 6, 2001 Comments of the CEA to the FCC, MM Docket No. 00-39). This figure is disputed by broadcasters (see May 7, 2001 Comments of NAB/MSTV/ALTV to the FCC, MM Docket No. 00-39).

[44] Consumer Electronics Association, *Americans Should Not Be Forced to Buy DTV Over-the-Air Tuners Says CEA*, Press release, August 8, 2002, available at [http://www.ce.org/press_room/press_release_detail.asp?id=10012].

[45] National Association of Broadcasters, *Fact Vs. Myth: The DTV Tuner Integration Debate*, available at [http://www.dtvprofessional.com/2002/08_aug/editorials/nab_dvttuners.htm].

Meanwhile, the agreement between the consumer electronics and cable industries on a cable-DTV interoperability standard could impact the CEA's view of the digital tuner mandate. If the agreement is approved by the FCC, the circuitry enabling "plug and play" compatibility between digital televisions and cable systems could be modified to receive digital over-the-air signals at an incremental cost. Under this scenario, it is possible the CEA could reassess its opposition to the digital tuner mandate.[46]

On July 23, 2003, Representative Terry introduced H.R. 2825 (the Consumer Access to Digital Television Enhancement Act of 2003) which would require the FCC to adopt and implement the MOU between the cable and consumer electronics industries regarding a cable/DTV interoperability standard. H.R. 2825 would also require all television receivers marketed or labeled as "digital cable ready" to come equipped with the capability to receive over-the-air digital broadcast signals.

Copyright Protection Technology. Many content providers (e.g. movie studios and broadcast networks) are reluctant to provide high quality digital content to DTV owners until they are assured that interoperability standards and technology licensing agreements are in place to prevent consumers from making unauthorized copies and Internet transmissions of digital content. In 1998, five consumer electronics manufacturing companies — Hitachi, Intel, Matsushita, Sony, and Toshiba — formed an entity called the Digital Transmission Licensing Administrator (DTLA, also known as "5C") to license a jointly developed Digital Transmission Content Protection (DTCP) technology. DTCP is designed to protect audiovisual and audio content against unauthorized interception or retransmission in the digital home environment.

On July 17, 2001, two major studios — Warner Bros. and Sony Pictures Entertainment — announced a licensing agreement to adopt DTCP. The agreement is designed to permit the studios to protect prerecorded media, pay-per-view, and video-on-demand transmissions against unauthorized copying, and to protect all content against unauthorized Internet retransmission, while assuring consumers' ability to continue customary home recording of broadcast and subscription programming.[47]

Broadcast Flag. While DTCP protects content delivered to the home via cable or satellite, the technology does not protect over-the-air broadcast content. Other major studios have been reluctant to sign licensing agreements with DTLA until broadcast content can also be protected. Additionally, broadcast networks (ABC, CBS, and Fox) have opposed the 5C standard, arguing that the technology's inability to encrypt over-the -air broadcasts will cause high quality content to migrate toward cable and satellite exclusively. A week after the 5C agreement with Sony Pictures and Warner Bros. was announced, the five other major studios (Disney,

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[46] Clark, Drew, "Electronics Group Shows Flexibility on Digital TV Issue," *National Journal's Technology Daily*, January 27, 2003.

[47] DTLA Press Release, "DTLA, Sony Pictures Entertainment and Warner Bros. Announce First Studio Licenses for Digital Home Network Technology," July 17, 2001, see [http://www.dtcp.com/data/press/DTCP_PRESS_010717.pdf].

Paramount, Fox, Universal, and MGM) submitted a proposal to DTLA which would require digital broadcast content to be encrypted with a "broadcast flag" preventing Internet distribution or retransmission of digital content broadcast over-the-air. On June 3, 2002, a group of engineers from the motion picture and technology industries[48] released a detailed "broadcast flag" proposal. While the proposal is strongly supported by the content industry, the technology industry remains divided, with some companies supporting and others opposing this particular proposal. Some consumer groups have also expressed opposition.

Those supporting a broadcast flag (such as the Motion Picture Association of America and other content providers) argue that the protections against piracy offered by a broadcast flag are crucial to ensure that content providers make high-value programming available over the digital airwaves. Supporters also argue that a broadcast flag will not prevent consumers from making physical copies of DTV programs, or from distributing such copies within a person's home digital network. Opponents of a broadcast flag (many consumer electronics and high tech companies, as well as consumer groups) assert that because electronic devices will have to be meet certain specifications in order to process the broadcast flag, the innovation and functionality of consumer electronics equipment will be adversely affected. Additionally, they argue, because the broadcast flag would effectively ban any retransmission not approved by content providers, legitimate consumer rights (e.g. "Fair Use") would be compromised.

On August 9, 2002, the FCC issued a notice of proposed rulemaking (FCC 02-231, MB Docket 02-230) in the matter of digital broadcast copy protection. Noting that the lack of digital broadcast copy protection is a significant impediment to the DTV transition, the FCC solicited public comment on whether the FCC can and should mandate the use of a copy protection mechanism for digital broadcast television. The comment period closed on February 18, 2003; over 6000 comments were received, most from individual citizens.

On November 4, 2003, the FCC adopted a rule which gives broadcasters the option of inserting a "broadcast flag" into their over-the-air broadcast transmissions. By July 1, 2005, all consumer electronics devices capable of receiving an over-the-air DTV signal must be manufactured to incorporate content protection technologies that will limit the redistribution of digital television content when the broadcast flag is recognized. Before DTV devices can be manufactured, however, content protection technologies must be approved. The FCC has established an "interim procedure" whereby parties will certify that their content protection technology meets FCC criteria. After a period of public comment, the FCC will determine whether or not to approve that particular technology. The FCC issued a *Further Notice of Proposed Rulemaking* in order to formulate a permanent approval procedure for content

[48] The Broadcast Protection Discussion Group (BPDG), a subgroup of the Copy Protection Technical Working Group (CPTWG).

protection technology.[49] On August 4, 2004, the FCC adopted a Report and Order approving thirteen digital output protection technologies and recording methods.[50]

Analog Hole. Another copyright protection issue of concern to content providers is what's commonly referred to as the "analog hole." In the foreseeable future, many consumers will continue to use analog televisions. In order to display the content carried by digital signals, analog televisions will be equipped with a digital tuner (a set-top box) which converts the signal from digital to analog. At this point, the digital signal, even if content protected, is converted into an unprotected analog form which could then be easily converted into a similarly unprotected digital form subject to the unauthorized copying and Internet transmission the content providers are seeking to prevent. Accepted copyright protection technologies to "plug" the "analog hole" have not yet been developed, and will likely require further technology development and negotiation involving the content providers and consumer electronics manufacturers.

Cable/DTV Interoperability Standards. Interoperability standards between digital televisions and cable systems are necessary in order for consumers to be able to watch digital programming over their cable systems. Currently, interoperability is achieved via the proprietary set-top box leased to the subscriber by the local cable company. Given the absence of a national interoperability standard, consumers are, at present, unable to purchase DTV products from consumer electronics stores which can be directly connected to cable systems without the use of a set-top box. Two separate entities — the consumer electronics industry (including manufacturers and retailers) and the cable system operators — have embarked on an often contentious process of determining the specific technical details of how DTV devices might achieve nation-wide compatibility and interoperability with cable systems.

Section 304 of the Telecommunications Act of 1996 directed the FCC to adopt regulations to assure the commercial consumer availability of "navigation devices" (i.e. set-top boxes, remote control units) without jeopardizing the rights of a cable provider to protect its signal from theft. Currently, proprietary set-top boxes are "integrated" with two overall functions: security and navigation (i.e. allowing the subscriber to flip from channel to channel). A 1998 order adopted by the FCC (FCC 98-116) requires the cable operators to separate the security functions from non-security functions and to make available (by July 1, 2000) modular security

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[49] *FCC Report and Order and Further Notice of Proposed Rulemaking in the Matter of Digital Broadcast Content Protection* , MB Docket No. 02-230, FCC 03-273, released November 4, 2003.

[50] *FCC Order in the Matter of Digital Output Protection Technology and Recording Method Certifications*, FCC 04-193, released August 12, 2004.

components to the consumer electronics industry.[51] Allowing time for transition, the FCC would prohibit the sale or lease of new "integrated" boxes as of July 1, 2006.

On February 22, 2000, the Consumer Electronics Association (CEA) and the National Cable Television Association (NCTA) announced a voluntary agreement on a set of technical requirements that permit the direct connection of digital television receivers to cable television systems. In January 2002, CableLabs (a research organization of the cable industry) published specifications for the OpenCable Applications Platform (OCAP), which would serve as a uniform interoperability cable/DTV standard. However, consumer electronics manufacturers and retailers and the cable industry sharply disagree over the pace and specific technical details (including copy protection requirements) of how interoperability should be implemented.

Disagreement over DTV/cable interoperability continues was prominently aired during the September 25, 2002 House Energy & Commerce Committee hearings on the digital transition. NCTA argued that proprietary set-top boxes already allow a seamless DTV/cable interoperability, that there are, therefore, no compatibility problems between DTVs and cable systems, and that consumers' inability to purchase cable-ready DTVs or set-top boxes from consumer electronics stores is not a critical component of the digital transition. However, regardless of digital transition issues, the cable industry said it supports the retail availability of cable-ready DTV products because it is in its own business interest to do so.[52] NCTA added that it has developed the required interoperability standards, and is further advocating a "DVI connector" on all integrated DTV sets, which would allow consumers to upgrade and receive advanced interactive services from their cable or satellite provider.[53]

An opposing view was expressed at the hearings by consumer electronics manufacturers and retailers. A spokesperson for the Consumer Electronics Retailers Coalition (CERC) argued that interoperability standards will be ineffective unless and until the cable industry's own proprietary equipment relies on and supports those same standards. Without that reliance and support, they argued, interoperable DTV devices manufactured by the consumer electronics industry cannot be competitive (in

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[51] Also referred to as a Point of Deployment or "POD" module, this would consist of a smart card that could be inserted into the consumer electronics device to provide the security required by the cable operator. A "national security interface" is required to ensure that POD modules from all the different local cable operators would satisfactorily operate in every device. To manufacture a "POD reliant" device, the manufacturer must sign a POD-Host Interface License Agreement ("PHILA").

[52] Subscribers of satellite TV ("DBS," the primary competitor to cable) can use the same equipment anywhere in the country. This "portability" gives DBS a marketing advantage over cable.

[53] Testimony of Michael Wilner, Vice Chairman and CEO, Insight Communications, and Chairman, NCTA, before the House Subcommittee on Telecommunications and the Internet, September 25, 2002.

terms of cost or functionality) with the cable industry's proprietary equipment.[54] Additionally, testimony from a consumer electronics manufacturer stated opposition to a mandated and ungradable connector on all DTVs, arguing that this equipment is likely not needed on small and mid-size televisions, and that making such connectors compatible with future digital technologies is a "daunting, if not impossible, task."[55]

On December 19, 2002, the cable and consumer electronics industries announced they had reached an agreement on a cable compatibility standard for an integrated, unidirectional digital cable television receiver. The two industry groups filed a Memorandum of Understanding (MOU) with the FCC, outlining the agreement. According to the MOU, the industries will continue to negotiate a "bidirectional" standard that would enable consumers to receive advanced services (such as video on demand) without the need for an external navigation device. On January 7, 2003, the FCC issued a Further Notice of Proposed Rulemaking (FCC 03-3) which seeks comment on the MOU and proposed FCC rules which would be necessary to implement the industry agreement. Opposition to the agreement's "encoding rules" has been expressed by several organizations, including the Motion Picture Association of America, makers of personal video recording technology (TiVo), and consumer groups.

On September 10, 2003, the FCC adopted a Second Report and Order which adopts, with certain modifications, the MOU agreement between the cable and consumer electronics industries. The new rules allow for the manufacture of "plug and play" television sets that will receive one-way digital signals (from the cable company to the consumer) without the need for a set-top box. However, consumers will have to obtain from their cable operator a security card (a "POD" or "cable card") that must be inserted into the TV set. A set-top box will still be required for two-way services such as video on demand or pay-per-view. The cable and consumer electronics industry will continue to negotiate over this issue. Finally, the Order initiates a subsequent proposed rulemaking (Second Further Notice of Proposed Rulemaking) which will examine some remaining issues.[56]

Digital Conversion of Public Broadcasting Stations. The FCC set a deadline of May 1, 2003 for public television stations to convert to digital. Public television consists of 176 licensees operating 357 stations nationwide. According to the Association of America's Public Television Stations (APTS), as of July 2004, 263 public television stations were offering digital broadcast services, covering 87% of all U.S. TV households. Meanwhile, 214 noncommercial educational stations requested extension of the May 1, 2003 buildout deadline. The FCC has granted all

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[54] Testimony of Alan McCullough, Chairman, President & CEO, Circuit City Stores, Inc., representing CERC, before the House Subcommittee on Telecommunications and the Internet, September 25, 2002.

[55] Testimony of Richard M. Lewis, Chief Technology Officer, Zenith Electronics Corporation, before the House Subcommittee on Telecommunications and the Internet, September 25, 2002.

[56] FCC Press Release, *FCC Eases Digital Transition for Consumers*, September 10, 2003, available at [http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-238850A1.pdf].

of those extension requests; 134 stations filed for second extensions, with 129 granted.[57]

Raising money for the digital conversion is a challenge for many public television stations, especially those in small markets. According to APTS, the total nationwide cost of conversion is $1.7 billion. State governments have provided most of the funding to date, about $476 million, with private sources providing $260 million. The federal government has provided $221 million.[58] Public broadcasters have been seeking a substantial federal contribution ($699 million over five years) for digital conversion. This funding would be used to pay for the new equipment and physical infrastructure required for digital conversion (e.g. transmitters, translators, and production equipment). Public stations are seeking this funding from the Public Telecommunications Facilities Program (PTFP), a grant program administered by the National Telecommunications and Information Administration (NTIA) at the Department of Commerce.

The PTFP, which has provided matching grants for public broadcasting equipment for over 35 years, has begun funding digital conversion, awarding $15.7 million for 44 digital television conversion projects in FY1999, $18 million for 31 projects in FY2000, $35 million for 52 projects in FY2001, and $36 million for 52 projects in FY2002, $25 million for 56 projects in FY2003, and $9.8 million for 31 projects in FY2004.

For FY2004, the Administration proposed to suspend all grants under the PTFP. As an alternative, the Administration proposed making $80 million available for the digital transition from the Corporation for Public Broadcasting's already enacted FY2004 funding. The FY2004 CJS bill (H.R. 2799, H.Rept. 108-221), as passed by the House on July 23, 2003, also provided no funding for PTFP grants. The Senate version of the FY2004 CJS bill (S. 1585, S.Rept. 108-144), as reported, would provide $55 million for PTFP. The FY2004 Consolidated Appropriations Act (P.L. 108-199) provided $22 million for PTFP in FY2004.

For FY2005, the Administration again proposed terminating the PTFP. As an alternative, the Administration proposed funding of $20 million for digital transition grants for public television stations from within the Corporation for Public Broadcasting's already enacted FY2005 funding of $390 million. The House FY2005 CJS bill (H.R. 4754), as passed, would also terminate the PTFP. The Senate FY2005 CJS bill (S. 2809) would provide $21.77 million for PTFP. The FY2005 Consolidated Appropriations Act (H.R. 4818/P.L. 108-447) provides $21.77 million for PTFP.

Whereas PTFP grants go for equipment, federal funds from the Corporation for Public Broadcasting (CPB) are supporting the development and distribution of digital content. For FY2001, the Labor-HHS-Education Appropriation Act (P.L. 106-554) appropriated $20 million to CPB for investment in DTV programming and distribution, but required congressional authorization before it could be released.

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[57] See [http://www.fcc.gov/mb/video/files/dtvsum.html].

[58] *Communications Daily*, May 1, 2003, p. 10.

The FY2001 Supplemental Appropriations Act (H.R. 2216, P.L. 107-20, signed July 24, 2001) contained language authorizing release of those funds to CPB. For FY2002, the Administration requested an additional $20 million for CPB for the purposes of digital conversion. Both House and Senate versions of the FY2002 Labor-HHS-Education appropriation bills (H.R. 3061, H.Rept. 107-229/S. 1536, S.Rept. 107-84) sought to provide $25 million to CPB for digital conversion. The House bill would provide the funding pending authorization legislation. The Labor-HHS conference report (H.Rept. 107-342) provided $25 million for equipment and facilities to enable public broadcasters to meet the statutory deadline for digital conversion as proposed by the Senate. The conference agreement did not provide these funds contingent upon authorization as proposed by the House. The bill was signed into law (P.L. 107-116) on January 10, 2002.

For FY2003, the 108th Congress, the FY2003 Omnibus Appropriations (P.L. 108-7) provided $48.7 million to CPB for digital conversion. The Administration's FY2004 budget proposal requested that $80 million of CPB's already enacted FY2004 appropriation be allocated to digital conversion. The House version of the FY2004 Labor-HHS-Education appropriations bill (H.R. 2660, H.Rept. 108-188), as passed by the House on July 10, 2003, matched the Administration proposal. The Senate Labor-HHS-Education appropriations bill (S. 1356, S.Rept. 108-81) provided an additional $55 million in "new money" for digital conversion in FY2004. Ultimately, the FY2004 Consolidated Appropriations Act (P.L. 108-199) provided $50 million in "new money" to CPB specifically for digital conversion.

The FY2005 House Labor-HHS-Education appropriations bill (H.R. 5006, passed by the House on September 9, 2004) designates up to $20 million for digital conversion from CPB's already enacted FY2005 appropriation. The Senate version of the FY2005 Labor-HHS-Education appropriations bill (S. 2810, reported by the Senate Appropriations Committee, September 14, 2004) would provide $49.7 million in "new money" for digital conversion. The FY2005 Consolidated Appropriations Act (H.R. 4818/P.L. 108-447) provides $39.7 million in "new money" for digital conversion.

Additionally, the FY2004 Senate Agriculture Appropriations bill (S. 1427;S.Rept. 108-107) provided $15 million in public broadcasting system grants (from the Distance Learning and Telemedicine account of the Rural Utilities Service) to allow noncommercial stations that serve rural areas to convert from analog to digital operations. Within the agriculture appropriations section of P.L. 108-199, the Distance Learning and Telemedicine account of the Rural Utilities Service includes $14 million in FY2004 to assist digital conversion of rural public television stations.

The FY2005 House Agriculture Appropriations bill (H.R. 4766), as passed, includes no funding for digital television conversion. The FY2005 Senate Agriculture Appropriations bill (S. 2803; S.Rept. 108-340), approved by the Senate Appropriations Committee on September 14, 2004, would provide $13 million for digital conversion. The FY2005 Consolidated Appropriations Act (H.R. 4818/P.L. 108-447) provides $10 million for public television digital conversion.

Satellite Television and "Digital White Areas". Under current law, satellite television providers are permitted to provide distant network signals (from

"out of market" network affiliates) only to subscribers living in "white areas" – meaning they receive inadequate analog television broadcast signals from their local broadcasters. Legislation was introduced into the 108th Congress (H.R. 4501/H.R. 4518/S. 2644) which would explore the possibility of creating "digital white areas" such that some subscribers may be eligible for distant network digital signals via their satellite dish if they cannot receive local digital TV signals. In November 2004, Congress passed the Satellite Home Viewer Extension and Reauthorization Act (SHVERA) as part of the FY2005 Consolidated Appropriations Act (H.R. 4818/P.L. 108-447). SHVERA provides limited authority for satellite companies to offer "distant digital signals" if certain conditions are met. For more information on this issue, see CRS Report RS21990, *Satellite Television and "Digital White Areas": Provisions of the 2004 Satellite Home Viewer Extension and Reauthorization Act* by Marcia S. Smith.

Low Power TV. Low Power Television (LPTV) was created by the FCC in 1982 to serve rural areas and individual communities within larger urban areas. LPTV stations may not exceed 3 kilowatts for VHF channels or 150 kilowatts for UHF channels, and must not cause interference in the reception of full service television stations. Currently, there are 2119 LPTV stations in the United States. Concerns have arisen that many LPTV stations will lose their licenses in the transition to DTV. While the FCC's February 1998 modification to its table of allotments for DTV licensees did provide for some LPTV licensees to be relocated to new frequencies, many would still lose their licenses under FCC digital transition plans. To provide some relief for LPTV licensees, the Community Broadcasters Protection Act of 1999 was enacted as part of the Intellectual Property and Communications Omnibus Reform Act of 1999 (P.L. 106-113). This law established a "class A" status to qualifying LPTV licensees, giving them a measure of protection from full-power TV stations in the transition to DTV. The act directs that class A licensees be accorded primary status as television broadcasters, prescribes the criteria LPTV stations must meet to be eligible for class A status, and outlines the interference protection class A stations must provide to other television stations. To implement the act, in April 2000, the FCC established rules for class A LPTV licensees, to facilitate the acquisition of capital for LPTV stations to continue to provide free, over-the-air programming to their communities.[59]

In accordance with the 1992 Cable Act (47 USC 534), cable television providers are required to transmit to their audiences the locally-generated programming of all full-power TV broadcasters that request carriage, a provision known as "must-carry." Under the 1992 Act, some LPTV stations are entitled to "must-carry"status if they meet certain criteria.[60] The FCC's April 2000 ruling did not address the question of whether class A licensees should be entitled to the "must-carry" provision, as are

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[59] *FCC Report and Order in the Matter of Establishment of Class A Television Service*, MM Docket No. 00-10, FCC 00-115, released April 4, 2000.

[60] Those criteria (47 USC 534) include (among other requirements) that the community of license of the LPTV station has a population not exceeding 35,000, that there is no full-power TV station licensed to any community within the county or other political subdivision (of a state) served by the cable system, and that the LPTV station provides the only news coverage in its community of license.

full-power broadcast TV stations. A petition filed with the FCC argued that class A licenses should be granted the same "must-carry" status as full-power broadcasters. The FCC subsequently ruled that class A stations do not have the same must carry rights as full service television stations.[61] The Local Voices on TV Act of 2003 (H.R. 1626, introduced April 3, 2003 by Representative Peterson of Minnesota) would provide cable carriage rights for qualified class A television stations.

On August 6, 2003 the FCC adopted a Notice of Proposed Rulemaking[62] to seek comment on rules for digital low power television and digital television translator stations. On September 9, 2004, the FCC adopted rules to allow for the digital conversion of LPTV and translator stations. While requiring the conversion to digital operation, the FCC did not set a digital transition deadline for LPTV and translator stations. The final transition date – on which analog operations will cease – will be considered in the FCC's Third DTV periodic review proceeding.[63]

Meanwhile, the FCC Reauthorization Act of 2003 (S. 1264; S.Rept. 108-140), introduced by Senator McCain on June 13 and reported by the Senate Committee on Commerce, Science and Transportation on September 3, 2003, would direct the FCC to initiate a rulemaking to authorize the operation of digital television translators and digital on-channel repeaters.

Fees for Ancillary or Supplemental Services. The Telecommunications Act (P.L. 104-104) states that if a DTV licensee offers ancillary or supplemental services for which they receive a subscription fee or other compensation, the FCC "shall establish a program to assess and collect from the licensee...an annual fee or other schedule or method of payment ..." The act further states that the collection of fees "shall be designed (i) to recover for the public a portion of the value of the public spectrum resource made available for such commercial use, and (ii) to avoid unjust enrichment through the method employed to permit such uses of that resource."[64] Congress is overseeing the FCC's actions regarding implementation of this law. Public interest groups have also maintained pressure on the FCC to establish a fee program, arguing that broadcasters should compensate the American people for the use of the DTV spectrum, and that fees should be required out of fairness to those who paid for spectrum at FCC auctions (such as licensees for personal communications services).

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[61] *FCC Memorandum Opinion and Order on Reconsideration in the Matter of Establishment of Class A Television Service,* MM Docket No. 00-10, FCC 01-123, released April 13, 2001.

[62] *FCC Notice of Proposed Rulemaking in the Matter of Amendment of Parts 73 and 74 of the Commission's Rules to Establish Rules for Digital Low Power Television, Television Translator, and Television Booster Stations and to Amend Rules for Digital Class A Television Stations,* MB Docket No. 03-185, FCC 03-198, released August 29, 2003.

[63] For further information, see:
[http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-251978A1.pdf]

[64] The Budget Resolution of 1997 (H.Con.Res.84) included a provision requiring broadcasters to pay a spectrum usage fee of $2 billion over five years. Broadcasters strongly opposed that provision, however, and it was not included in the Budget Act of 1997.

In November 1998, the FCC adopted rules to require broadcasters to pay 5% of their gross revenues from ancillary or supplementary uses of DTV spectrum for which they charge subscription fees or other specified compensation.[65] These include subscription video, software distribution, data transmissions, teletext, interactive materials, aural messages, paging services, and audio signals. Home shopping channels and "infomercials" are not subject to fees because the FCC did not consider them new services. The FCC has initiated a separate proceeding to determine how much non-commercial stations can use the DTV spectrum for revenue-generating services, and whether they should have to pay spectrum fees. Some consumer groups say that the FCC's spectrum fees are not heavy enough on commercial broadcasters, arguing that most revenue will come from home shopping and infomercials. They also warn that public broadcasters should not be over-regulated, arguing that too heavy a burden placed on public broadcasters could impair their long-term viability.

On October 11, 2002, the FCC ruled that noncommercial stations are required to use their entire digital capacity primarily for nonprofit, noncommercial, educational broadcast services. However, the FCC also ruled that the statutory prohibition against advertising on noncommercial broadcasts does not apply to any ancillary or supplementary services presented on an excess DTV channels that does not constitute broadcasting. The FCC further ruled that public stations must pay a fee of five percent of gross revenues generated by ancillary or supplementary services provided on their DTV service.[66]

Public Interest Obligations of DTV Broadcasters. In March 1997, President Clinton established an Advisory Committee on Public Interest Obligations of DTV Broadcasters, to make recommendations on how DTV licensees should compensate the public for their licenses. Committee members were selected from government, the broadcasting industry, academia, and consumer interest organizations. After a series of public meetings in 1997 and 1998, the Committee submitted a set of recommendations to Vice President Gore in December 1998. The recommendations consist of mostly voluntary actions by broadcasters, including providing five minutes per night of air time for candidate-centered discourse in the 30 days prior to an election. Some panel members wanted to recommend mandating the free air time as well as other Committee proposals. The White House referred the report to the FCC, which on December 15, 1999, opened a Notice of Inquiry (NOI) proceeding to solicit public comment on public interest obligations of TV broadcasters as they transition to DTV (MM Docket No. 99-360).

After reviewing public comment, the FCC, in September 2000, issued the *DTV Public Interest Form* Notice of Proposed Rulemaking (NPRM) which sought to require television broadcasters (both digital and analog) to disclose on a quarterly standardized form how they are serving the public interest. Also in September 2000,

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[65] *FCC Report and Order on Fees for Ancillary or Supplementary Use of Digital Television Spectrum,* MM Docket No. 97-247, released November 19, 1998.

[66] *FCC Report and Order in the Matter of Ancillary or Supplementary Use of Digital Television Capacity by Noncommercial Licensees*, MM Docket No. 98-203, FCC 01-306, released October 17, 2001.

the FCC issued the *Children's DTV Public Interest* NPRM (MM Docket No. 00-167), which focused on the obligation of broadcasters to provide educational and informational programming for children, and the requirement that licensees limit advertising in children's programs. The FCC has not yet issued any decisions in those proceedings. Given the significant amount of time that has passed, the Second Periodic Review of FCC rules and policies affecting DTV conversion, issued on January 27, 2003, has asked for further comment on the public interest obligation issue.[67] On August 4, 2004, the FCC adopted a Report and Order (FCC-04-192) which implements several steps identified in the Second Periodic Review. However, no action was taken regarding public interest obligations.

On September 9, 2004, the FCC adopted a Report and Order[68] addressing children's programming obligations for digital television broadcasters. The FCC issued guidelines on the obligation to provide educational programming for children and the requirement that children are protected from excessive and inappropriate commercial messages. Specifically, the Order increases the required amount of core educational programming proportionally to the amount of increased free video programming offered by the broadcaster on multicast channels. Regarding commercial limitations, the Order concludes that commercial limits apply to all digital programming directed at children 12 and under, whether the programming is provided on a free or pay multicast channel.[69]

Tower Siting. One obstacle to the broadcasters' ability to offer DTV services is the opposition from state and local communities over the building of new signal transmission towers.[70] In most cases, DTV antennas can be built on top of existing towers used for analog TV broadcasting. If new towers are required, however, they must be constructed before the stations can transmit DTV signals. In August 1997, the FCC released an NPRM (FCC 97-182) to consider the preemption of state and local zoning restrictions on the siting, placement, and construction of DTV broadcasting facilities. In its January 18, 2001 Report and Order, the FCC concluded that "while some stations are facing problems with tower availability and/or local zoning issues, such problems do not seem to be widespread at this time."[71] The FCC will continue to monitor the situation and intends to work with the involved parties as problems arise.

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[67] NPRM, *Second Periodic Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television*, p. 39-42.

[68] *Report and Order and Further Notice of Proposed Rulemaking in the Matter of Children's Television Obligations of Digital Television Broadcasters*, MM Docket No. 00-167, FCC 04-221, released November 23, 2004, 54 pages.

[69] For more information see:
[http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-251972A1.pdf]

[70] For more information on DTV tower siting, see [http://www.fcc.gov/mb/policy/dtv/].

[71] *FCC Report and Order and Further Notice of Proposed Rulemaking In the Matter of Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television*, MM Docket No. 00-39, FCC 01-24, p. 37.

Activities in the 108th Congress

A number of bills were introduced into the 108th Congress, relating in some way to digital television (see Appendix). Some have urged Congress to require broadcasters to return the analog spectrum on "a date certain." Under this approach, spectrum would be freed up for other uses. Among legislation in the 108th Congress, the HERO Act (H.R. 1425 and within 9/11 Commission omnibus bills H.R. 5024, H.R. 5040, and S. 2774) would have prohibited any delay in reassigning the 24 MHz for public safety purposes, and required those frequencies to be operational by January 1, 2007.

During March and April 2004, another digital transition proposal was informally circulated by the Media Bureau of the FCC.[72] Under this proposal, the transition deadline would be moved from 2006 to 2009. Cable and satellite providers would be required to carry a broadcaster's digital signal only, but could — if the broadcaster so chooses — down-convert the digital signal to an analog signal that cable or satellite customers could watch on their analog televisions. Under this scenario, according to the Media Bureau proposal, cable and satellite TV households watching down-converted digital signals on their analog sets would be counted toward the 85% statutory threshold required in order for broadcasters to return to the government their valuable analog spectrum, which can then be auctioned and/or assigned for other purposes. Given that cable and satellite television households currently comprise 88% of all television households, it is likely that the 85% threshold will be satisfied in most areas. Subsequently, analog spectrum would be reclaimed and analog television sets would no longer be able to receive over-the-air television broadcasts unless they are equipped with a converter box.

The broadcasting industry has expressed strong opposition to the Media Bureau's proposal.[73] According to the broadcasters, the proposal would discourage the development of digital television services (such as HDTV and multicasting) and remove the incentive for consumers to purchase DTVs. Additionally, they argue, if analog spectrum is reclaimed under the Media Bureau proposal, the 12% of TV households that are exclusively "over-the-air" — many of whom are economically disadvantaged — would lose their television service altogether unless they purchased DTVs, converter boxes, or cable or satellite television subscriptions. In response to these criticisms, Kenneth Ferree, head of the Media Bureau, argues that the development of digital services will not be adversely impacted because market forces will ensure that popular stations will likely be carried by cable and satellite TV providers in both digital and analog form by 2009. Additionally, suggests Ferree, economically disadvantaged over-the-air households could receive federal subsidies (derived from reclaimed spectrum auction proceeds, for example) for purchasing

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[72] The Media Bureau's digital transition proposal has not yet been released as a formal document.

[73] Written Ex Parte Submission in MB Docket Nos. 03-15 & 98-120, April 15, 2004, Available at [http://www.nab.org/Newsroom/PressRel/Filings/LetterReFerreePlan041504.pdf].

converter boxes, thereby ensuring that these households will continue to receive television service.[74]

During the summer of 2004, Congress held three hearings on the digital television transition. On June 2, 2004, the House Energy and Commerce Committee, Subcommittee on Telecommunications and the Internet, held a hearing on the Ferree proposal – "Advancing the DTV Transition: An Examination of the FCC Media Bureau Proposal." A June 9, 2004 hearing held by the Senate Committee on Commerce, Science and Transportation – entitled, "Completing the Digital Television Transition,"– also examined the Ferree proposal and other digital transition issues including the possibility of consumer subsidies for converter boxes.

Finally, the House Subcommittee on Telecommunications and the Internet held another hearing on July 21, 2004, looking specifically at lessons learned from Berlin, Germany, which successfully underwent a transition to digital television in 2003. The hearing, entitled, "The Digital Television Transition: What We Can Learn from Berlin," featured the release of a General Accountability Office (GAO) report entitled, *German DTV Transition Differs From U.S. Transition in Many Respects, but Certain Key Challenges Are Similar*. The GAO identified three elements responsible for Berlin's successful digital transition: implementing extensive consumer education, providing subsidies to low-income households for converter boxes, and setting a near-term, widely recognized shut-off date for analog TV service.[75]

On July 22, 2004, the National Commission on Terrorist Attacks Upon the United States (the 9/11 Commission) released its final report. The Commission recommended that Congress support legislation "which provides for the expedited and increased assignment of radio spectrum for public safety purposes." In response to this recommendation, on September 21, 2004, Senator John McCain introduced S. 2820, the SAVE LIVES Act. S. 2820 would change the digital transition deadline from December 31, 2006 to December 31, 2008. Spectrum for public safety would be freed for use by first responders, and other spectrum would be available for commercial uses. Proceeds from the auctioning of commercial spectrum would be credited to a Digital Transition Consumer Assistance Fund. The Fund would be used to establish a $1 billion digital transition program, administered by the Secretary of Commerce, which would subsidize consumers who continue to rely exclusively on over-the-air broadcasts with analog televisions. The program would give priority to low-income households, and would provide assistance for purchasing digital-to-analog converter boxes or other technologies which would allow consumers to continue receiving television signals.

S. 2820 also requires labeling of analog televisions (with the label stating it is unable to receive digital signals without a converter box), directs the Department of Commerce (in consultation with the FCC) to submit a report to Congress

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[74] Boliek, Brooks, "Feds: No analog TV by '09," *Hollywood Reporter*, April 15, 2004.

[75] See U.S. General Accountability Office, *German DTV Transition Differs From U.S. Transition in Many Respects, but Certain Key Challenges Are Similar*, GAO-04-926T, July 21, 2004. 22 p.

recommending a consumer education program on the digital transition, and requires the FCC to issue final decisions on its proceedings regarding DTV must-carry and public interest obligations.

During the September 22, 2004 markup of S. 2820 in the Senate Committee on Commerce, Science and Transportation, an amendment was offered by Senator Conrad Burns which sets a digital transition deadline (December 31, 2007) *only* for spectrum that has been designated for public safety, and provides that the FCC may waive the deadline in a given market "to the extent necessary to avoid consumer disruption while ensuring the ability of relevant public safety entities to use such frequencies." The Burns amendment was subsequently adopted by the Committee.

On September 29, 2004, Senator McCain offered a modified version of S. 2820 as an amendment to the National Intelligence Reform Act of 2004 (S. 2845). As in Committee, Senator Burns offered a modifying amendment to the McCain amendment. At the request of Senator McCain, the Senate approved by unanimous consent the McCain amendment as modified by the Burns amendment. The final version adopted into S. 2845 sets the digital transition deadline of December 31, 2007 only for spectrum that has been designated for public safety. Language regarding the FCC's authority to waive the deadline to avoid consumer disruption was modified to read: "only if all relevant public safety entities are able to use such frequencies free of interference by December 31, 2007, or are otherwise able to resolve interference issues with relevant broadcast licensee by mutual agreement."[76] The Senate passed S. 2845 on October 6, 2004. Other provisions of S. 2820 relevant to digital television are retained within the Senate-passed version of S. 2845. However, the sections regarding the Digital Transition Consumer Assistance fund and the $1 billion in consumer digital transition subsidies are moot, because the legislation limits the digital transition deadline only to public safety spectrum and does not authorize auctions of commercial spectrum currently used for analog television broadcasts. Also, labeling requirements would only go into effect if the FCC acts to set a hard deadline for the return of analog spectrum.

The House-passed version of S. 2845 (passed on October 16, 2004) contains a nonbinding provision (Section 5011) expressing the "sense of the Congress" that the 85% penetration test should be eliminated and that broadcasters should be required to cease analog transmissions by December 31, 2006 in order that analog spectrum can be returned for public safety and commercial uses. The conference report version of S. 2845 contained a digital television provision similar to the House language. Section 7501 states that it is the sense of Congress that "Congress must act to pass legislation in the first session of the 109th Congress that establishes a comprehensive approach to the timely return of analog broadcast spectrum as early as December 31, 2006" and that any delay in the adoption of such legislation will "delay the ability of public safety entities to begin planning to use this needed spectrum." The Intelligence Reform and Terrorism Prevention Act of 2004 (P.L. 108-458) was signed into law on December 17, 2004.

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[76] For more information on this issue, see CRS Report RL32622, *Public Safety, Interoperability and the Transition to Digital Television*, by Linda K. Moore.

Activities in the 109th Congress

The 109th Congress will likely continue to debate whether and how a "hard date" for the DTV transition should be implemented, thereby freeing reclaimed analog spectrum. Key policy questions include should the existing statutory digital transition deadline of December 31, 2006 be implemented by modifying or removing the 85% digital penetration threshold requirement, or would a later and redefined transition deadline be more appropriate? Should the reclaiming of analog spectrum for public safety uses be singularly designated, or should it be included as part of a comprehensive approach to returning all of the analog spectrum?

Paramount in this debate is the issue of addressing the millions of American over-the-air households whose existing analog televisions will require converter boxes in order to receive digital signals – if and when the analog signal is turned off. Related policy questions include should some form of financial assistance (subsidies or tax credits, for example) be provided by the federal government to enable over-the-air households to purchase converter boxes or digital televisions? Should such assistance be provided to low-income households exclusively or to all households? Should subsidies, if warranted, be financed by proceeds garnered by auctioning the analog spectrum? And finally, how much funding would a subsidy program require, and how much revenue is likely to be raised by auctioning the commercial portion of the reclaimed analog spectrum?

Appendix — Legislation in the 108th Congresses Related to Digital Television

H.R. 426 (Sensenbrenner). TV Consumer Choice Act of 2003. Prohibits the FCC from requiring digital tuners in television receivers. Introduced February 3, 2003; referred to Committee on Energy and Commerce.

H.R. 1396 (Markey). Spectrum Commons and Digital Dividends Act of 2003. Requires FCC to ensure that any rules necessary to effectuate the timely transition to digital television are promulgated and completed prior to making available the bands of frequencies at 747-762 and 777-792 MHz for advanced commercial mobile services or other competitive wireless services. Also provides increased funding to assist digital conversion of public television stations. Introduced March 20, 2003; referred to Committee on Energy & Commerce.

H.R. 1425 (Harmon). Homeland Emergency Operations Response Act. Prohibits any delay in reassigning 24 MHz in the upper 700 MHz band (currently occupied by television broadcasters) for public safety purposes, and requires those frequencies to be operational by January 1, 2007. Introduced March 23, 2003; referred to Committee on Energy & Commerce.

H.R. 1626 (Peterson). Local Voices on TV Act of 2003. Provides cable carriage rights for qualified class A television stations. Introduced April 3, 2003; referred to Committee on Energy & Commerce.

H.R. 2825 (Terry). Consumer Access to Digital Television Enhancement Act of 2003. Requires the FCC to adopt and implement the MOU between the cable and consumer electronics industries regarding a cable/DTV interoperability standard. Also requires all television receivers marketed or labeled as "digital cable ready" to come equipped with the capability to receive over-the-air digital broadcast signals, and establishes minimum required power levels for digital broadcasts. Introduced July 23, 2003; referred to Committee on Energy & Commerce.

H.R. 4501 (Upton). Satellite Home Viewer Extension and Reauthorization Act of 2004. Requires the FCC to initiate an inquiry into setting a distant network standard for digital television. Introduced June 3, 2004; referred to Committee on Energy and Commerce. Reported by Committee (H.Rept. 108-634) July 22, 2004.

H.R. 4518 (Smith, L)
W.J. (Billy) Tauzin Satellite Television Act of 2004. Requires the FCC to initiate an inquiry into setting a distant network standard for digital television. Introduced June 4, 2004; referred to Committee on Judiciary. Reported by Committee (H.Rept. 108-660) September 7, 2004. Passed by House October 6, 2004.

H.R. 5024 (Pelosi). 9/11 Commission Recommendations Implementation Act of 2004. Prohibits any delay in reassigning 24 MHz in the upper 700 MHz band (currently occupied by television broadcasters) for public safety purposes, and requires those frequencies to be operational by January 1, 2007. Introduced September 8, 2004; referred to multiple committees.

H.R. 5040 (Shays). 9/11 Commission Report Implementation Act of 2004. Prohibits any delay in reassigning 24 MHz in the upper 700 MHz band (currently occupied by television broadcasters) for public safety purposes, and requires those frequencies to be operational by January 1, 2007. Introduced September 9, 2004; referred to multiple committees.

S. 1264 (McCain). FCC Reauthorization Act of 2003. Directs the FCC to initiate a rulemaking to authorize the operation of digital television translators and digital on-channel repeaters. Introduced June 13, 2003; referred to Committee on Commerce, Science and Transportation. Reported by Committee (S.Rept. 108-140) September 3, 2003.

S. 1621 (Brownback). Consumers, Schools, and Libraries Digital Rights Management Awareness Act of 2003. Prohibits the FCC from mandating particular content protection technologies in its regulation on Digital Broadcast Content Protection; rather the FCC will establish objective standards and allow manufacturer self-certification to meet those standards. Introduced September 16, 2003; referred to Committee on Commerce, Science and Transportation.

S. 2644 (Ensign). Satellite Home Viewer Extension and Rural Consumer Access to Digital Television Act of 2004. Requires the FCC to set a distant network standard for digital TV, and requires that satellite carriers discontinue distant digital signals once a subscriber can receive a terrestrial digital signal. Introduced July 14, 2004; referred to Committee on Commerce, Science and Transportation. On July 22,

2004, ordered to be reported with an amendment in the nature of a substitute favorably.

S. 2774 (McCain). 9/11 Commission Report Implementation Act of 2004. Prohibits any delay in reassigning 24 MHz in the upper 700 MHz band (currently occupied by television broadcasters) for public safety purposes, and requires those frequencies to be operational by January 1, 2007. Introduced September 7, 2004; placed on Senate legislative calendar under General Orders, September 8, 2004.

S. 2820 (McCain). Spectrum Availability for emergency Response and Law Enforcement to Improve Vital Emergency Services Act (SAVE LIVES Act). Designates digital transition date as December 31, 2008, and establishes a fund to subsidize primarily low-income consumers for the purchase of digital-to-analog converter boxes and other technologies in order that they may continue to receive over-the-air broadcasts after the transition. Introduced September 21, 2004; referred to Committee on Commerce, Science and Transportation. Amended in Committee on September 22, 2004 to limit transition date only to public safety spectrum.

S. 2845 (Collins). National Intelligence Reform Act of 2004. Burns amendment (No. 3773, adopted September 29, 2004) requires return of public safety spectrum by December 31, 2007 under certain conditions as determined by the FCC. Introduced September 23, 2004; measure laid before Senate by unanimous consent. Passed by Senate with amendments, October 6, 2004. Passed House as amended, October 16, 2004. Conference report (H.Rept. 108-796) agreed to by House and Senate on December 7 and 8, respectively. P.L. 108-458 signed by President December 17, 2004.